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Li Peng Heads Three Gorges Project Construction Committee

40101008D Beijing CHINA DAILY in English 3 Apr 93 p 1

[Text] Chinese Premier Li Peng yesterday presided over the first meeting of the new construction committee which will oversee the 57 billion yuan (about \$10 billion) Three Gorges project.

To ensure smooth progress, the government decided earlier this year to set up the Three Gorges Project Construction Committee (TGPCC) with Li Peng at its head.

The deputy heads of TGPCC are Vice-Premier Zou Jiahua, State Councillor Chen Junsheng, Vice-Minister of the State Planning Commission Guo Shuyan, Governor of Hubei Province Jia Zhijie, Governor of Sichuan Province Xiao Yang and Li Boning, an official in charge of resettlement and development for the Three Gorges Project reservoir area.

The committee is the policy-making body for the project. It will have authority over three divisions responsible for construction, relocation of displaced people and management of the project.

The Three Gorges Project Relocation and Development Bureau under TGPCC is responsible for formulation and implementation of the relocation programme of the project.

The government has set up the China Yangtze Three Gorges Project Development Company, which is in charge of the construction and management of the project.

The company is the owner of the project. As an independent economic entity, it is responsible for raising capital, repaying of debt and the managing of the project.

Li Peng told those at yesterday's meeting to implement the resolution made last year by the National People's Congress on construction of the Three Gorges Project.

He said the current priority is to complete all preparations well, establish all necessary organizations and map out and approve the project's initial design.

He said that channels must be explored to collect funds for the project, adding that efforts must be made to adopt the international practice of tendering for various stages of construction and to secure financial accountability.

At the meeting, deputy heads of the committee Guo Shuyan and Li Boning made reports concerning preparations for the project and relocation of people now living in the reservoir area. (XINHUA)

Computer Firm Gets 100 Million Yen in High-Tech Deal

40101008B Beijing CHINA DAILY (Economics and Business) in English 19 Mar 93 p 2

[Text] Beijing Stone Group Company, the country's largest privately-owned computer enterprise, yesterday clinched a deal with a local financial institution to borrow 100 million yuan (\$17.2 million) for high-tech development.

An agreement on the deal was signed between the Stone company and the Beijing Urban Credit Co-operatives in Beijing.

The computer company plans to use the loans to support its projects in development of lighting appliances and colour printing machines, said Li Xiaolie, a senior company official.

Analysts say the deal illustrates the country's financial institutions have made a change in their lending policies starting this year, with a stronger support to the privately-owned industrial sector.

In efforts to give sufficient financial backing to the high-tech development of the private sector, Li said, the Beijing Urban Credit Co-operatives chose the Stone company, believing the company's two development projects will bring great benefit to both the co-operatives and the city's economy.

The two projects include a newly-established Stone-Matsushita lighting appliances development company and a colour printing house, which will be soon set up in Beijing with part of the investment from a United States' company.

The Stone-Matsushita joint venture is expected to be the nation's largest enterprise of this kind by 1996, when annual output value is expected to total 600 million yuan (\$103.4 million).

The anticipated Sino-American colour printing house will also be the most advanced factory for the country's printing industry, after it goes into operation in the near future, Li said.

The two projects are serving the Stone company's goal to turn itself from a single-product computer manufacturer to a comprehensive conglomerate with a string of high-tech products during the years to come, he added.

Thanks to a swelling market demand and an improving national economy, the Stone company saw its business income reach 3 billion yuan (\$517 million) in 1992, representing an increase of 700 million yuan (\$121 million) over the previous year.

Chemical Firm To Focus on Exports

40101008A Beijing CHINA DAILY (Supplement)
in English 5 Mar 93 p 6

[Text] Good production and business prospects are foreseen for the Shanghai Chlorine Alkali Chemical Company.

With a total share capital of 800 million yuan (\$138 million) and being a joint venture which has issued the largest amount of both A and B stocks on the mainland, Shanghai Chlorine Alkali Chemical Company is a super enterprise with an annual production capacity of 350,000 tons of caustic soda and 220,000 tons of polyvinyl chloride (PVC).

Realizing that the domestic market demand was very small, it aimed at the international market at the very beginning when the company began production in early 1990.

And, with support from the central government, the company gained the right to independently decide its import and export businesses within a very short period.

The company has made good use of the national move of transferring enterprise mechanism in the past two years to export-oriented production and develop new domestic and international market for its products.

Its efforts have led to "bumper harvests" for the past two successive years with the total annual foreign currency earnings from foreign trade surpassing \$30 million in 1991 and 1992.

Last year, it successfully transformed the company into a super Sino-foreign joint venture and built up a direct export channel by setting up trading centres abroad and a temporary custom station at the company's export wharf along the Huangpu River.

The company attaches great importance to the production management of export commodities to assure product quality. Advanced international standards were strictly applied in production, for instance, PVC and ion exchange membrane caustic soda, the company's major export products were produced with advanced standards practiced by Japanese companies.

The limited company has also set up a quality assurance system in line with the international ISO9000 serial standards, commonly regarded as an entry permit into world market.

Most of the products, 98 percent to be more exact, were found to be excellent in quality and sample inspections by the city's technical supervision bureau turned out that the company's products were 100 percent up to the standard.

The Shanghai Municipal Government has recently honoured the chlorine alkali producing joint venture as a

company with advanced technologies and thus help it win an advantageous position in both domestic and world market.

The company also involves itself in such activities as holding regular meeting on foreign trade, actively taking part in various exhibition fairs in order to have a clear understanding of the marketing situations of its product and developing potentials of the market at home and abroad.

Ordinary foreign trade business can be done with only one telephone call, with foreign customers' files available at the company and the ordered export goods can reach Hong Kong via the company's wharf in Shanghai within 2 weeks.

One thing worth mentioning is that the company provides equally good service and respect to both big and small customers, in accordance with its marketing principal "customer is god". It has not ignored small customers while maintaining stable business contacts with big Chinese and foreign customers.

Meanwhile, the company is not satisfied with the export of common PVC and high purity ion exchange membrane soda products. And new export products are being developed to meet world market demand such as changing low density and liquid caustic soda to high density solidified soda.

In addition, different brands of PVC products were produced according to consumers' demand while new products such as paste resin and polytetrafluoroethylene were developed for export trading.

Along with the ongoing-deep reform of interior mechanisms in share-holding enterprises, Shanghai Chlorine Alkali Chemical Company Ltd is making all efforts to catch up with advanced world level by improving production management, assuring excellent product quality.

It can be expected that the company's foreign currency earnings this year will climb up to a new record following excellent showings in the past 2 years.

CNCCC Wins Important Fertilizer Project

40101008C Beijing CHINA DAILY (Economics and Business) in English 27 Mar 93 p 2

[Article by staff reporter Zhang Yu'an]

[Text] China's leading chemical construction contractor yesterday signed a deal in Beijing with the country's top technology importer and exporter.

The contract is for the construction of a large phosphate fertilizer plant in Southwest China's Yunnan Province.

The agreement is between the China National Chemical Construction Corporation (CNCCC), under the Ministry of Chemical Industry, and the China National Technical Import and Export Corporation.

CNCCC won the 9.5 billion Japanese yen (\$82.37 million) project after defeating foreign bidders amid fierce competition.

The factory will be financed by a Japanese government loan.

It is the first time CNCCC has won such a big project in China through international bidding, indicating the corporation has strengthened its ability to compete in global chemical construction.

The \$82.37 million will not only be used to build the plant but will also be spent on importing production techniques, technology and key equipment from Russia through the Russian Technology and Equipment Import and Export Corporation.

The Russian technology will help Yunnan Province, an important phosphorus fertilizer production base in China, to use its abundant low-grade phosphorus ores to make semi-finished products for badly-needed phosphorus fertilizers.

The enterprise, a key State project for 1991-95, will produce 60,000 tons of yellow phosphorus a year to create 400,000 tons of high-density phosphorus fertilizer—double super-phosphate—annually.

The project is therefore expected to help develop the country's agriculture through easing its short supply of phosphorus fertilizer.

It will also aid China's railways by reducing transport volume. Phosphorus ores produced in Yunnan have had to be carried by train to other places for the production of phosphorus fertilizer.

**CAS Shanghai Institute of Technical Physics
Profiled***93FE0468A Beijing GUANGMING RIBAO in Chinese
9 Jan 93 p 1*

[Article by correspondent Dai Jing [2071 2417] and reporter Xie Jun [6200 6511]: "Shanghai Institute of Technical Physics Marches Toward High-Tech Group"]

[Text] Major reform has begun to take place at CAS Shanghai Institute of Technical Physics (SITP) since the first of the year. Through reorganization and redeployment of personnel, a new elite research team dedicated to the development of high-tech products has been formed. It is an attempt to gradually change the institute from a bureaucracy that conducts a great deal of research but little production into a highly profitable high-tech group that is centered around a high-class research organization.

SITP is a major organization in the research and development of infrared optoelectronics. In recent years, the institute implemented reforms in basic research, applied research and technology development. As major technical accomplishments materialized, revenue has increased by several fold. In 1985, the institute had gross income of 9.83 million yuan and in 1992 it was 37 million yuan. In 1987, the sales of high-tech products totaled 1.74 million yuan and in 1992 they exceeded 70 million yuan.

Nevertheless, the leadership is not satisfied. They believe that the institute has not broken loose from the old system. To this end, an overall reform plan was implemented. It is aimed at turning the institute into a streamlined research organization dedicated to high-tech products with a single management system to serve the society. The objective is to create a new system to circulate talent, technology, information and working capital between research and development and production. Specifically, it is implemented as follows.

The 11 existing laboratories will be gradually streamlined into five departments, including a key national infrared physics laboratory and an infrared devices engineering center. The institute will be a nucleus of research and development for the industry to create technological innovation based on market demand and to transfer personnel and technology to high-tech industries. With the financial gain obtained from transfer of technical accomplishments to existing companies, the institute will create a business group that includes several high-tech industries in infrared optoelectronic device, optoelectronic instrumentation and optoelectronic engineering. These high-tech companies will be run as business entities that integrate technology, engineering and sales. The institute and the business group will have a strong joint management team. The director of the institute will be the chairman of the board of the business group. The leadership of the institute will become board members as well.

The existing research service department will be converted into a technical equipment company and a technical service company that provide services internally with compensation and operate externally as businesses. They will become highly efficient service-oriented companies, an industry of the third kind.

The existing 1,000 employees of the institute will be redeployed as follows in response to the reorganization outlined above. The research and development department will reduce its work force from the present level of 600 to 300. New high-tech companies will expand work forces from the present level of 126 to 370. The administration department will be streamlined to 80 people from 252. The service companies will have 150 people.

Yan Yiba [0917 0034 1056], the newly appointed associate director of the Chinese Academy of Sciences (also director of SITP), confidently pointed out that the goal is to implement a benign development cycle by the end of the Eighth 5-Year Plan. By the year 2000, the institute will become a national research and development center for infrared optoelectronics. The high-tech business group, the institute and the third industry will become an internationally famous entity in the field having annual output values of 300, 35 and 30 million yuan, respectively.

Research Institute of Electric Wave Propagation*93FE0468B Zhengzhou HENAN RIBAO in Chinese
25 Feb 93 p 6*

[Article by Chen Wen [7115 2429]: "Research Institute of Electric Wave Propagation"]

[Text] China Institute of Electric Wave Propagation (Research Institute 22 of MMEI) is the only institute dedicated to research on radio wave propagation in China.

The institute is located in Xinxiang. It has over 1,500 employees and 12 laboratories, a machine-building factory, a print shop, three research centers in other parts of the country and 11 electric-wave observation stations including the South Pole Great Wall Station and Zhongshan Station. It is equipped with advanced instrumentation, possesses an abundance of measured data and technical information, and has the ability to perform sophisticated machining work with a quality-assurance system.

The focal point of research at China Institute of Electric Wave Propagation is to study the propagation of electromagnetic waves in a variety of media and their applications. The results are directly applied in electronic systems such as radar, communications, radio and television broadcasting, navigation, telemetry, aviation and oil prospecting. The institute has considerable capability in research, development, systems engineering and commercialization of products in areas such as electronic oil prospecting, ultra-short-wave mobile and fixed

communications, microwave communications, mine-shaft communications, computer networks, short-wave frequency selective communications, satellite communications, electric power load control and automatic dispatch, underground target detection, thunderstorm location, electronic food measurement and maintenance and antenna engineering. As of the end of 1991, it had received a total of 674 technical achievement awards, including 42 national awards and 109 ministry and province awards. A total of 878 papers have been presented at conferences or published in technical journals worldwide.

No. 613 Research Institute of Ministry of Aerospace Industry

93FE0468C Zhengzhou HENAN RIBAO in Chinese
25 Feb 93 p 6

[Article by Chen Wen [7115 2429]: "No. 613 Research Institute of Ministry of Aerospace Industry (MAS)"]

[Text] No. 613 Research Institute of MAS is located in Luoyang. It is a research organization engaged in the design of electronic systems for aeronautical applications. The institute is set up to handle special fields such as control systems engineering, computer applications, optics and micromachining, optoelectronic display technology, and infrared and laser applications. It has over 1,300 employees and is authorized to award master's degrees. The institute owns several thousand pieces of advanced equipment. A series of experimental methods has been established to adapt scientific research to product development. The institute has a pilot plant to produce both military and commercial products; it is

capable of handling machining, optical processing, printed-circuit-board fabrication and component loading. It has the facility to perform precision testing, electronic component aging testing and routine product testing. The pilot plant can be used for pilot production—as well as small-batch production—of new military and commercial products.

Since its founding, No. 613 Research Institute has made major breakthroughs in the development of military products in areas such as control systems, distributed computer information network systems, automatic target tracking, computer image processing, optoelectronic display and control, optical diffraction application, laser ranging, infrared sensing, and systems simulation, resulting in the development of a number of advanced airborne electronic control instruments. In addition, it also worked on technical projects for industries such as machine building, cement, ceramics, brewing, fertilizer, mining and electric power. It employs microelectronics to modify machines and industrial furnaces and boilers. Automatic process monitoring and control has been implemented. Military technology has been transferred for commercial use to push industry forward. Furthermore, the institute is actively involved in the development of a series of high-tech, high-value-added electronic and electromechanical products such as a digital molybdenum wire-cutter control panel, comprehensive camera exposure tester, external cardiac defibrillator and dynamic cardiac monitor. They have been designated as novel or high-tech products at the national, provincial and city level. In the past 20 years, the institute has received more than 400 technical achievement awards, including 20 national and over 50 ministry-level awards.

Ion Conductivity in Nanoscale $\text{Ca}_{1-x}\text{La}_x\text{F}_{2+x}$

93P60207A Beijing KEXUE TONGBAO [CHINESE SCIENCE BULLETIN] in Chinese Vol 38 No 3, 1-15 Feb 93 pp 221-223

[Article by Su Fang [5685 2499] and Xie Bin [6200 2430] of the University of Science and Technology of China Basic Physics Center, Structural Analysis Open Laboratory, Hefei 230026, and Wu Xijun [0702 1585 0193] and Qin Xiaoying [4440 2556 5391] of the CAS Institute of Solid State Physics, Hefei 230031: "Ion Conductivity in Nanometer $\text{Ca}_{1-x}\text{La}_x\text{F}_{2+x}$ "; supported by grants from NSFC and State High-Tech [863] Plan New Materials Area; MS received 7 Jul 92, revised 16 Oct 92]

[Abstract] Via an inert gas evaporation and vacuum in-situ pressurization/vacuum deposition technique, the authors have prepared two bulk nanoscale materials exhibiting fluorine ion conductivity— CaF_2 and $\text{Ca}_{0.75}\text{La}_{0.25}\text{F}_{2.25}$ —the first report worldwide of F ion conductivity in nanoscale materials. The CaF_2 material has very uniform ultrafine particles with a granularity of 10-20 nm (average 15 nm). Measurements indicate that the nanoscale CaF_2 ion conductivity is higher than that

of polycrystalline CaF_2 by 1 order of magnitude (at 300°C) or 0.8 order of magnitude (at 530°C), and 2 orders of magnitude higher than that of monocrystalline CaF_2 ; ion conductivity activation energy is 1.13 eV. For the nanoscale $\text{Ca}_{0.75}\text{La}_{0.25}\text{F}_{2.25}$ material, ion conductivity measures 1 order of magnitude (at 300°C) or 0.6 order of magnitude (at 530°C) higher than that for the nanoscale CaF_2 ; ion conductivity activation energy is 0.997 eV. Figure 1 (not reproduced) shows a TEM photograph of the material granularity while Figures 2 and 3 (not reproduced) depict various graphs of the measured data.

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First Medical Giant Established

40101006A Beijing CHINA DAILY (National)
in English 20 Feb 93 p 3

[Text] Beijing Yuandong Medical Development Corp., a first and the largest State-owned medical entity in the capital city, was recently established. Located at Beijing Health School, the corporation is designed to put together talents with specialities in medical field, investments and advanced facilities to research, manufacture and also market new pharmaceuticals.

Research Stepped Up for Cure of Hepatitis B

40101006B Beijing CHINA DAILY (National)
in English 2 Mar 93 p 3

[Text] Research into medicines for hepatitis B is to be stepped up.

The State Science and Technology Commission and the State Administration of Traditional Chinese Medicines are jointly strengthening their research into one of China's most dangerous illnesses.

Medical experts estimated that some 130 million people in China are carrying the hepatitis B virus, and another 30 million have developed chronic hepatitis B.

Each year, some 200,000 to 300,000 people die of liver diseases, the majority hepatitis B patients.

The Science and Technology Commission has long put priority on scientific research on hepatitis B drugs, and determined hepatitis B control as one of the State's key research items.

It organizes senior medical specialists to carry out laboratory and clinic research on traditional Chinese herbs and drugs.

Under its guidance, the Liver Disease Experts' Committee of the Chinese Academy of Traditional Chinese Medicines and Benxi No 3 Pharmaceutical Plant in Liaoning Province have developed a series of hepatitis B medicines through six years' research and clinical work.

The medicines, which specialists believe will fill the gap in preventing and curing hepatitis B, won a gold medal for the national "Torch" high-tech products organized by the Science and Technology Commission.

New Military Drug Group Opens in Xi'an

40101006C Beijing CHINA DAILY (BUSINESS WEEKLY) in English 1 Feb 93 p 7

[Article by Ma Lie]

[Text] Xi'an—Shanhaidan enterprise group, which is China's second military pharmaceutical enterprise, has been set up in Xi'an, capital of Northwest China's Shaanxi Province.

The group, which includes Shanhaidan Development Centre of the Second Artillery Engineering College (SAEC), Xi'an Chinese Medicine Multi-Subject Research Institute and Xi'an Hongqing Pharmaceutical Factory, follows Shenzhen's 999 Enterprise Group, the country's first such project.

According to Zhao Gaoxin, general manager of Shanhaidan Enterprise Group, within five years the group will establish five solely-owned or joint venture pharmaceutical enterprises in China and 15 enterprises involving other industries including computers, machinery and chemicals. The group expects to produce 1.1 billion capsules of medicine annually with a production value of 500 million yuan (\$86.2 million).

Zhao said that a new workshop and a new production line have been set up with 8 million yuan (\$1.4 million) in spending and another 6 million yuan (\$1 million) has been invested in a workshop and warehouse to safeguard the quality of capsules and enlarge production capacity.

The group also plans to build two hospitals in Xi'an and Beijing.

"We are going to work with Japan and South Korea to produce a cure for heart disease using Chinese herbal medicine," Zhao said.

The Correlation Between the Maturation of *rbcl* Transcripts and Its Flanking Sequence in a Prokaryotic System

40091009K Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese Vol 19 No 6, Dec 92 pp 558-568

[English abstract of article by Xu Yuquan [6079 3558 3123] of the Department of Plant Science, Shanghai Agricultural College, Shanghai 202201, Shinji Akada, Hiroaki Machii, and Kong Xianduo [1313 2009 6995] of the Department of Botany, University of Maryland, College Park, USA]

[Text] There is a 15 bp large reverse repeated sequence proceeded by a 7 bp small one in the 3' flanking region of *rbcl* of *Nicotiana tabacum*. A 383 bp of *XbaI* fragment containing these tandemly repeats was inserted into the plasmid p λ SA, at the position between the λ_p and the *cat* gene. Then these two repeats were separated and deleted systematically to obtain various deletions. The deletion pRT65, pRT74 and pRT83 was sequenced to determine the deleted base pairs exactly.

S1 mapping analysis was adopted to investigate the transcripts of these deletions in *E. coli* JM83. The results showed us that the stability of mature 306 bp mRNA relied on the large repeat and a short sequence downstream. The small one was not efficient.

The regulation level of the *rbcl* termination was also investigated. The *XbaI*-*EcoRI* fragments from pRT65, pRT74 and pRT83 were transferred into pSP-TT* at the

position between the spinach promoter and threonine terminator to construct pRT65, pRT74 and pRT83 respectively. The results from S1 mapping analysis showed that the *E. coli* RNA polymerase read through the 3' flanking region of *rbcL* gene and terminated at the stop site of threonine terminator. These results suggested that mature *rbcL* mRNA might be the product precisely processed from a precursor mRNA and the 3' flanking sequence might be the signal for precursor mRNA to be processed to the correct position.

Key words: *rbcL*, Deletion, S1 mapping, Posttranscriptional procession

Construction and Characterization of Shuttle Plasmid pBHG1 in *Bacillus Thuringiensis* and *Escherichia coli*

40091009J Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese Vol 19 No 6, Dec 92 pp 549-557

[English abstract of article by Guo Sandui [6753 0005 1018] and Fan Yunliu [5400 0061 0362] of the Laboratory of Molecular Biology, Biotechnology Research Center, Chinese Academy of Agricultural Sciences 100081]

[Text] The recombinant plasmid pBHGA was constructed by ligating plasmid pHTA1030 from *B. thuringiensis* to plasmid pJH101 from *E. coli*. The recombinant plasmid pBHGA was digested and deleted by various restriction enzymes, generating 14 derived recombinant plasmids differing in molecular weight. The expressible analysis for the plasmid pBHG1 from among the derived plasmids in *E. coli* HB101 and *B. subtilis* 168, the results proved the recombinant plasmid pBHG1 is carrying promotive region, original region and segregational stability region of *B. thuringiensis* plasmid pHTA1030. The recombinant plasmid pBHG1 can be a high-frequency plasmid being transformed into *B. thuringiensis* HD-1 Cry⁺ B and a high-expression plasmid in *B. thuringiensis* HD-1 Cry⁺ B. The plasmid pBHG1 is segregationally stable in *B. subtilis* 168 at 45°C. These plasmids may be useful tools for study of plasmid replication and expression in *B. thuringiensis* once a reproducible transformation system is available for this organism.

Key words: *Bacillus thuringiensis*, Shuttle plasmid, Construction, Characterization

Study on the Meiotic Mapping and Functions of Another New Osmotic-Sensitive Gene-*osm3* in *Saccharomyces cerevisiae*

40091009I Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese Vol 19 No 6, Dec 92 pp 541-548

[English abstract of article by Zhi Huijun [5120 1979 6511], Li Taosheng [2621 2711 3932], and Chen Shiyi

[7115 1102 1837] of the Department of Biology, Hangzhou University, Hangzhou 310012. The project supported by National Natural Science Foundation of China.]

[Text] Another recessive nuclear gene mutation of *Saccharomyces cerevisiae*, *osm3*, which causes growth inhibition on hypertonic media, has been mapped on the chromosome II by tetrad analysis. Its second-division segregation frequency is about 51.01 percent, and the map distances between *osm3* and the centromere of chromosome II is about 25.51 centimorgans and it is approximately 45 centimorgans far gene gall. The studies on the reverse mutation of *osm3* indicated that this osmotic-sensitivity arises from a missense or nonsense mutation in *OSM3* locus.

The response of yeast to osmotic stress and the mechanism of *osm3* gene function were investigated. The results indicated that high intracellular glycerol content is necessary for yeast to grow in hypertonic media; the gene product of *osm3* is probably relative to the process of glycerol transportation. Finally, the effect of osmotic stress on fermentability was also discussed.

Key words: *Saccharomyces cerevisiae*, Osmotic-sensitive Gene *osm3*, Gene Mapping, Reverse mutation, Glycerol transportation

Cloning and Expression of α -Hydroxy- γ -Aminobutyl Acylase Gene of *Bacillus circulans* NRRL-B3312

40091009H Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese Vol 19 No 6, Dec 92 pp 534-540

[English abstract of article by Li Yuan [2621 0337], Liu Boying [0491 0130 5391], et al. of the Institute of Medicinal Biotechnology, Chinese Academy of Medical Sciences, Beijing 100050]

[Text] With shot-gun cloning strategy, the pUB110 plasmid was used as a vector to clone DNA fragment of *Bacillus circulans* NRRL-B3312, which is a butyrosin producer, into *Bacillus subtilis* 168. Among the transformants, the results of TLC, bioautography and FAB mass spectrum analysis for the bioconversion product of No. 733 transformant showed that this transformant could transform kanamycin into amikacin. According to these results, the *HABA* acylase gene locates on the insert fragment of pUBC733 plasmid harbouring No. 733 transformant. We can confirm that the *HABA* acylase gene was cloned and expressed in *B. subtilis* 168. Molecular weight of pUBC733 is 7.3 kb. Southern hybridization demonstrated that the 2.8 kb inserted fragment of this plasmid originated from *B. circulans* NRRL-B3312. The restriction map of pUBC733 plasmid was constructed.

Key words: Shot-gun cloning, Recombinant, Plasmid of pUBC733, Southern hybridization, Restriction map, HABA acylase gene (α -Hydroxy-r-Aminobutyl Acylase Gene)

The Effect of Plasmids on the Resistance of *E. Coli* to Phages

40091009G Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 456-458

[English abstract of article by Hu Yanmin [5170 1750 3046] of the Department of Biology, Hebei Normal University, Shijiazhuang 050016]

[Text] The introduction of the ColV, I-K94 or R124 plasmid into *Escherichia coli* K12 resulted in resistance to certain phages. Derivatives of *E. coli* carrying the plasmid R124 and ColV, I-K94 were more resistant to phages T4 and MeI compared with the plasmid-free parent and the plasmid ColV, I-K94 to phase TuII*. It suggested that an envelope change caused by the plasmids might be responsible for the resistance because most phages fail to absorb to the plasmid-bearing *E. coli* cells.

Key words: *Escherichia coli*; Plasmid; Resistance; Phage

Study on Characteristic of Antifungus Substance From *Bacillus Subtilis* B-903 Strain

40091009F Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 445-449

[English abstract of article by Kong Jian [1313 1696], Wang Wenxi [3769 2429 1119], Zhao Baige [6392 4101 7704], et al. of the Institute of Plant Protection, Henan Academy of Agricultural Sciences, Zhengzhou 450002]

[Text] Antagonistic substance which is strong antagonistic to various plant pathology fungi can be produced by *Bacillus subtilis* B-903 strain separated from apple orchard of Zhengzhou. The experiment showed: cultured on rotary shaker for 24 hours, the CFU [colony forming unit] of this bacteria reached the largest value in log increasing at this time, pH changed from acid to alkline and reached 7.5 at 41 hours, the antifungal activity of cultural filtrate could be detected simultaneously. As the decrease of CFU and decline of pH, antifungal activity increased gradually and reached the highest at 112 hours, this antifungal substance was thought to be the metabolites being produced in dying process of B-903. This substance is water dissoluble and stable in acid condition when autoclaved at 121°C for 20 minutes, but the antifungal activity disappeared when autoclaved in neutral and alkline conditions at 121°C for 20 minutes. In room temperature condition, this substance is stable in neutral and alkline situation.

Key words: *Bacillus subtilis*; Antifungus substances; Biological control

Abstraction of Hemolymph of House Fly and the Inducing of Its Antibacterial Matter

40091009E Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 439-444

[English abstract of article by Wang Yuancheng [3769 6678 4453], Liu Wei [0491 0251], and Yang Feng [2799 1496] of the Biotechnology Research Center, Chinese Academy of Agricultural Sciences, Beijing 100081, and Feng Guolei [7458 0948 5623] of the Institute of Zoology, Academy Sinica, Beijing 100080]

[Text] Antibacterial matter was induced from house fly (*Musca domestica*) by injecting *E. coli* into its body and by using sonic treatment. The activity and specificity of antibacterial matter were reported and the extraction method of hemolymph was also described. The results show that both injection and sonic method were able to induce antibacterial matter from house fly and the activity peak value appeared across 60 hours after treatment. After 48 hours and at the dilution of 100 times, the activity of antibacterial matter in hemolymph is 0.115 unit. The antibacterial matter could also have restriction effect on the growth of *E. coli*, *Staphylococcus aureus*, *Erwinia carotovora*, *Xanthomonas campestris*, and *Bacillus thuringiensis* but it had no effect on *Beauveria bassiana*. Inducing effect of the antibacterial matter on larva is higher than on adult insect. By using centrifuge method the yield of hemolymph is 2 times higher than the capillary method. The efficiency of centrifugal method is 50 times that of the capillary method.

Key words: *Musca domestica*; Hemolymph; Antibacterial matter

Purification and Characterization of Hec Toxin Produced by *Aeromonas Hydrophila*

40091009D Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 432-438

[English abstract of article by Tu Xiaolin [3205 1420 2651] and Lu Chengping [7120 2110 1627] of the Department of Veterinary Medicine, Nanjing Agricultural University, Nanjing 210014]

[Text] An extracellular toxin produced by *Aeromonas hydrophila* from cultured crucian carp with septicemia was detected. The toxin was purified by ammonium sulfate precipitation, DEAE-cellulose chromatography and Sephadex G-100 gel filtration. The factor was a single polypeptide with a molecular weight of 52.5 kd determined by SDS-PAGE. The heat-labile toxin possesses hemolytic, enterotoxic and cytolytic activities. The hemolytic activity on human erythrocytes was 3.81×10^3 HU/mg, CD_{50} for Vero cell was 0.26 μ g. The LD_{50} for crucian carp and mice was 4.44 μ g and 3.58 μ g respectively. The toxin can be neutralized by homologous antibodies. The toxin shows unique characteristics as compared with other known bacterial toxins, therefore the authors propose to name the toxin "hec" toxin.

Key words: *Aeromonas hydrophila*; hec toxin; Hemolytic activity

Studies on the Properties of α -Amylase Produced by *Bacillus Pumilus* 289 (pBX96)

40091009C Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 400-404

[English abstract of article by Ma Ming [7456 2494], Yang Lizhu [2799 7787 3796], et al. of the Laboratory of Biotechnology, Nankai University, Tianjin 300071]

[Text] The gene of α -amylase of *Bacillus megaterium* was cloned and expressed in *Bacillus pumilus*. The purified enzyme was obtained by salting out of $(\text{NH}_4)_2\text{SO}_4$ and DEAE-cellulose chromatography. The optimum pH of enzyme is 6.0. It is stable between pH 5-8. The optimum temperature is 55°C. The activity of enzyme was inhibited by Zn^{2+} , Ab^{2+} , Cu^{2+} , and a little activated by Ca^{2+} , Na^+ , K^+ . When PCMB was added at the concentration of 3×10^{-3} mol/L, 95 percent of enzyme activity was inhibited. The properties of immunology of enzyme are the same as that of α -amylase produced *Bacillus subtilis*.

Key words: *Bacillus pumilus* 289; α -amylase; Immunology

The Expression of 130kDa Mosquitocidal Protein Gene of *Bacillus Thuringiensis* Subsp. *Israelensis* in *Bacillus Subtilis*

40091009B Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 394-399

[English abstract of article by Zhang Xiangdong [1728 0686 2639] and Fan Yunliu [5400 0061 0362] of the Lab. of Molecular Biology, Biotechnology Research Center, Chinese Academy of Agricultural Sciences, Beijing 100081]

[Text] Two recombinant plasmid pFZ1 and pFZ2 containing Bti 130kDa mosquitocidal protein gene in opposite insertion orientation were constructed. The expression of 130kDa mosquitocidal protein of Bti in *Bacillus subtilis* was confirmed by western blotting. The mosquitolarvical activity against the larvae of *Aedes albopictus* was shown by the bioassay. (followed by Table 1.)

Key words: *Bacillus thuringiensis* subsp. *israelensis*; Gene encoding for 130kDa protein; gene expression in *Bacillus subtilis*

Morphology and δ -Endotoxin Proteins of *Bacillus Thuringiensis* From Soils and Their Toxicities to Insects

40091009A Beijing WEISHENGWU XUEBAO [ACTA MICROBIOLOGICA SINICA] in Chinese Vol 32 No 6, Dec 92 pp 387-393

[English abstract of article by Li Rongsen [2621 2837 2773], Dai Shunying [2071 7311 5391], et al. of the Wuhan Institute of Virology, Academia Sinica, Wuhan 430071]

[Text] Ninety-four strains of *Bacillus thuringiensis* were isolated from soils in southwest and northwest of China. The morphology of cells, spores and parasporal crystals of these strains was investigated under transmission and scanning electro-microscope. Proteins of δ -endotoxins from all strains were analysed by rapid SDS-PAGE. Nine species of insects in *Lepidoptera*, *Coleoptera* and *Diptera* were tested for assay of δ -endotoxins. Some kinds of parasporal crystals were quite different in form and in composition of protein from those reported before. Most of strains were nontoxic to all of 9 species used in bio-assay. Some strains were very effective in species of *Coleoptera* or *Noctuidae*.

Key words: *Bacillus thuringiensis*; δ -Endotoxin; *Coleoptera*

Table 1 Bacterial strains and plasmids

Strains and plasmids	Genotype or phenotype	Source
<i>B. subtilis</i> AS 1.1176	str ^r	Jiang Ruzhang, NanKai University
<i>B. thuringiensis</i> subsp. <i>israelensis</i> 4Q5	Killing mosquito larvae activity	This laboratory
in <i>E. coli</i> TG1 pFH2, pFH4	Amp ^r	Fan Yunliu, Hua Xuejun This laboratory
in <i>B. subtilis</i> AS 1.1176 pNQ 122	Cm ^r , Km ^r	Jiang Ruzhang, NanKai University
in <i>B. subtilis</i> AS 1.1176 pFZ1, pFZ2	Killing mosquito larvae activity Cm ^r , Km ^r	This study

Maoming Petrochemical Co.

93FE0354 Maoming MAOMING PETROCHEMICAL
CO. BROCHURE in Chinese 1992 pp 1, 3-10

[Brochure from Maoming Petrochemical Company]

[Excerpts] Main Units Under the Maoming Petrochemical Company

Oil Refinery, Ethylene Project Construction Headquarters, Oil Shale Mining Company, Construction Company, Machinery Plant, Construction Industry Company, Railway Transportation Company, Shuidong Harbor Company, Pipeline Department, Nanhai [South China Sea] High-Grade Lubricating Oil Company, Marketing Company, [illegible] [illegible] [illegible] [illegible] Research Academy, Design Academy, Employees' University, General Education Department, Employees' Hospital, Living Services Company, Huayue Enterprise Group Company, Jilian Development Corporation, Shihua Stockholding Company Ltd.

Address: Maoming City, Guangdong Province, China;
Postal code: 525011; Cable: 3555; Telephone: 262951 (switchboard); 264248 (direct); Telex: 453032 MMPC-CCN; Fax: 269317

Welfare Benefits

Maoming Petrochemical Co. has an integrated cultural, educational, medical, health, and household service system. It has formed an education network from elementary school to college and from regular education to adult training. It has established an employees' hospital with advanced equipment and a full complement of specializations and an employees' sanatorium covering 50,000 square meters of land that has an quiet and tasteful environment. There is a system of employee residences and welfare facilities that are being continually improved. Culture is extremely vigorous at the enterprise, its employees live and work in peace and contentment, and the enterprise is becoming increasingly attractive every day.

Horizontal Integration

Guided by the principle of "reform, open up", Maoming Petrochemical Company takes full advantage of its geographic situation of being located in Guangdong near Hong Kong and Macao with vast Southwest China at its back as well as its resource, capital, technology, and equipment advantages. It is continually intensifying internal reform, accelerating the pace of transforming administrative mechanisms, and adopting a variety of arrangements in a major effort to develop multi-level multi-sphere horizontal economic integration. It has already established over 100 joint venture projects that extend throughout Guangdong, Guangxi, Yunnan, Guizhou, Fujian, Hainan, and other provinces and autonomous regions. These joint ventures have spurred integration of the enterprise's superior factors of production, opened up new production and administration

realms, and spurred the enterprise's gradual movement toward the larger economic market.

Mining Production

Maoming Petrochemical Company has an oil shale open-cut mine with an excavation capacity of 8 million tons and the associated shale dry distillation system. Spurred by reform and opening up, Maoming's oil shale industry has gradually moved toward comprehensive development of oil refining, power generation, construction materials, chemical industry, and other areas, and has established a kaolin dressing plant, oil shale fluidized-bed boiler and oil shale electric power generators. We also utilize shale slag to produce cement, coal slurry from mining regions to produce red brick, and so on, which has opened up broad prospects for the comprehensive utilization of shale.

Construction Materials Production

Maoming Petrochemical Company's construction materials industry has a yearly production capacity of 4,500 tons of raw asphalt paper, 1.2 million rolls of tar paper, 140,000 tons of cement, and 13 million red bricks. The 300 gram and 350 gram Honeybee Brand tar paper we produce has been named a superior quality product by Guangdong Province. Our Red Flag Brand cement has the advantages of high grade, rapid solidification and hardening, short releasing time, and high initial strength. New products we have developed in recent years like oxybutyl latex asphalt waterproof coating, asbestos waterproof coating, highway latex asphalt, and so on have been deeply welcomed by users.

Structural Installation

Maoming Petrochemical Company has a structural installation and overhaul staff of more than 4,000 people with solid technical forces, precision equipment, advanced inspection and testing measures, and a fully-outfitted quality assurance system. They have all types of large and medium-sized construction machinery and have been licensed to design, manufacture, and install category 3 pressure vessels. They are capable of independently taking on large and medium-sized oil refining, petrochemical, chemical fiber, and chemical fertilizer facility construction and overhaul projects and provide superior-quality services in large-scale equipment transportation and hoisting, electrical instruments installation, pressure vessel manufacturing, on-site assembly of large oil tanks, boiler installation, corrosion protection for equipment, and structural construction.

Machinery Manufacturing

Maoming Petrochemical Company has a medium-sized machinery manufacturing plant covering 310,000 square meters of land with solid technical forces and advanced machinery and equipment that is mainly involved in manufacturing petrochemical equipment and components. It has over 500 pieces of equipment including a 12,000 Newton ram hydraulic press, 6,300 Newton

forging hydraulic press, and so on. The company is licensed to manufacture category 3 pressure vessels and has category 1 and category 2 pressure vessel design licenses as well as an actual annual machinery product processing capability of 3,000 tons/year. The technical quality of the HF induction welded helical finned tubes produced by this plant is at vanguard levels in China. Its HJJQ-108 casing crystallizer received a second-place S&T progress award from the China Petroleum Corporation. The large equipment and components designed and manufactured by the plant are now in widespread applications in petrochemical facilities.

Scientific Research and Design

Maoming Petrochemical Company has a scientific research and design organization with precision equipment and strong technical forces that does independent construction and manufacturing. Its research academy now has a history covering more than 20 years. It has nine research offices and one intermediate testing workshop and is mainly responsible for scientific research tasks in the fields of petroleum refining, petrochemical industry, fine chemical industry, rustproofing grease, industrial water treatment, equipment corrosion prevention, and environmental protection. The design academy has established seven specialized design offices that have received design certifications for eight types of category 3 pressure vessels and is a state grade-B design unit.

Oil Refining Production

Oil refining production is the main factor at Maoming Petrochemical Company. Our oil refining system has 63 oil refining and chemical industry facilities, 23 auxiliary facilities, the Zhan-Mao [Zhanjiang-Maoming] crude oil transmission pipeline with a real yearly light oil transmission capacity of 7 million tons that runs for a total length of 115 kilometers, the Mao-Shui [Maoming-Shuidong] finished oil product pipeline with an annual oil transmission capacity of 1.5 million tons, and Shuidong Harbor's dedicated 3,000-ton grade and 50,000-ton grade finished oil product pier. The company has a crude oil processing primary capacity of 8.5 million tons/year and secondary processing capacity of 4 million tons/year, and a lubricating oil production capacity of 250,000 tons/year. We have processed 18 types of crude oil from 13 countries and our oil refining technology is at a vanguard status in China, and we have attained advanced international levels and the best levels in China in intensive processing of sulfur-bearing crude oil from the Middle East and in aviation kerosene production, high-grade lubricating oil production, and other areas.

China Petrochemical Maoming Petrochemical Industry Company was established in 1955. It is a huge state comprehensive petrochemical industry enterprise focused on oil refining that is also involved in oil shale

development and utilization, construction materials production, machinery manufacturing, structural installation, scientific research on petrochemicals, engineering design, and other fields. It has 20 second-level specialized companies (plants and academies) and currently has 26,000 employees under the system of ownership by the whole people and 13,000 employees under the collective ownership system. Its gross value of industrial output was 3.1 billion yuan in 1991, with 4.1 billion yuan in income from sales and 2.13 billion yuan in original value of its fixed assets. It is ranked in 15th place in China in terms of business scale and is the largest oil refining industry base area in southern China.

Maoming Petrochemical Company is an economic entity that integrates production, management, and foreign trade. It produces 172 product varieties with a product standard coverage rate of 100 percent and has adopted international standards for production of 59 types of products. Its products are sold throughout the world in over 40 countries and regions and have an excellent reputation among users in China and foreign countries. Spurred by reform and opening up, our company has relied on S&T progress and reinforcement of enterprise management to make a transition from a production type to a production and management type. For the past several years it has been assessed as an advanced enterprise and superior quality enterprise in enterprise management in Guangdong Province and an advanced unit in the China Petrochemical Corporation and nationally in administration and management, and has received a national "May 1st" Labor Award and National Enterprise Management Superior Quality Award (Golden Horse Award).

Maoming Petrochemical Company is located in a coastal open economic zone close to the South China Sea and near to Hong Kong and Macao. It has two excellent deep-water harbors, Zhanjiang Harbor and Shuidong Harbor, is supported by two rail lines, the Li-Mao [Litang-Maoming] line and the Guang-Mao [Guangzhou-Maoming] line, and has access to all of China. It has quick access to information and convenient communication, and has superior geographic conditions and an investment environment.

During the Eighth 5-Year Plan, Maoming Petrochemical Company is moving toward a new development era. Maoming has already received state approval for construction of a 300,000 tons/year ethylene project and 300,000 tons/year cement plant and construction is now being speeded up on a 250,000 ton-grade single-point anchorage crude oil receiving and unloading facility, which have formed a preliminary integral configuration for development of the petrochemical industry. During the Ninth 5-Year Plan, Maoming Petrochemical Company will focus on developing into a huge comprehensive enterprise group in which oil refining is the "dragon's head", the petrochemical industry is the main factor, and comprehensive utilization of shale and machinery manufacturing, structural installation, and so on are the two wings.

Daheng Markets 'Hispeed' Microcomputer, Acceleration Boards, 3.2 GFLOPS Minisupercomputer

93FE0421C Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 4, 3 Feb 93 p 3

[Unattributed article: "Daheng Hispeed Microcomputer Unveiled"]

[Text] At the beginning of this year, the R&D center of Beijing Daheng [1129 1854] Company introduced to the market the Daheng "Hispeed" microcomputer. So far, Daheng has produced the Daheng Hispeed microcomputer, Daheng DH860-series acceleration boards, Daheng "SPARC" workstation and Daheng 3.2 GFLOPS (single-precision) minisupercomputer. All these products have made Daheng the "All-Capable Specialist" in our nation's high-speed processing area.

The Daheng Hispeed microcomputer is another new product which the Beijing Daheng Company has developed with its technical superiority and considerable experience in high-speed processing based on i860 series products. Based on its EISA-bus 486, it added the so-called "Cray-on-a-chip" i860 RISC chip from INTEL. This microcomputer is fully compatible with any 486 microcomputer. Its uniqueness is in its large internal storage, large throughput and super-high-speed floating point processing. Its single-precision floating-point processing speed can reach a peak of 66 MFLOPS. Tests with utility programs by users at CAS, the State Seismological Bureau, Qinghua University, and the University of Science and Technology of China indicate that its speed can reach 7 to 17 times that of an ordinary 486 microcomputer, exceeding the speed of a SGI 4D/25 workstation by over 50 percent.

This microcomputer supports the DOS and UNIX operating systems. It comes with an ADI/860 interface to run AUTO-CAD, 3DStudio, and other programs on 860 machines, thus significantly increasing processing speed. This machine fully utilizes the resources and the potential of the computer. It is particularly suited to areas of scientific and engineering calculations, high-speed CAD, petroleum/earthquake data processing, 3D modeling and animation design, real-time simulation, telemetry data processing, remote sensing processing, image processing, high-quality color printing, etc.

Nation's First Galaxy Intelligent Tool Computer System Unveiled in Changsha

93FE0421D Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 26 Feb 93 p 3

[Article by Tan Keyang [6223 0344 2254] and Cao Guanghui [2580 0342 2547]: "China's First Galaxy Intelligent Tool Computer Unveiled"]

[Text] Changsha, 25 Feb (XINHUA)—China's first Galaxy intelligent tool computer system passed evaluation in Changsha today. The development of this system

indicates that China has become one of a few countries in the world with the capability to independently design and manufacture a general-purpose artificial intelligence (AI) computer.

Designed and manufactured by the Computer Research Institute of the University of Science and Technology for National Defense (USTND), the Galaxy intelligent tool computer system is a major project of the nation's "863" program.

After more than 80 hours of technical and overall function evaluation, dozens of AI experts and professors from different areas of the country have concluded that the Galaxy intelligent tool computer is a general-purpose computer system with high performance. It is equipped with several AI languages and conventional programming languages. The speed of its logical inference has reached as high as 587,000 inferences per second (587 KLIPS). The speed of its conventional programming execution has reached 17.90 MIPS. It has functions such as automatic input of manually written programs and voice control. Its overall performance has reached the current international level with certain technical areas leading the international standard. Its development has turned a new page for China's AI technology.

Having received the assignment from a team of specialists at the National High-Tech Research and Development Program, the Computer Research Institute of USTND started the R&D project for the Galaxy intelligent tool computer in 1988.

It is known that research on AI computer systems has become a leading-edge topic in worldwide new-generation computer research. In the R&D process for this Galaxy project, led by USTND Professor Wang Pu [3769 2613], twenty-some middle-aged and young professionals not only followed the most up-to-date developments in international AI technology, but also combined characteristics of domestic AI applications. They emphasized the advancement of the technology as well as the practicality of the outcome. They have conducted extensive and in-depth research in areas of architecture, hardware implementation, operating system, optimization of the editing of the AI language and the AI interface. They have proposed and adapted a series of advanced, unique methods and technologies with which they overcame one difficulty after another. Finally, they outstandingly accomplished this important high-tech R&D project for our nation.

The successful development of the Galaxy intelligent tool computer will easily solve a lot of AI problems which could not be solved earlier with common computers.

NEW POWER 'Tabletop Supercomputer' on Market*93P60208A Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 9, 10 Mar 93 p 2*

[Article by Fang Yuhua [2075 3768 5478]: "Tabletop Supercomputer" NEW POWER on Market"]

[Summary] The NEW POWER 4860 dual-CPU microcomputer system was unveiled the other day at the Tianjin Tongbo [6639 0590] Electronics Company. With one Intel i486 microprocessor and one Intel i860 microprocessor (the latter being a superscalar RISC processor composed of a core RISC unit, a 74-bit FPU and a 3D graphics accelerator), the NEW POWER 4860 has a peak floating-point operating speed of 66 MFLOPS—compared to several or a few dozen MFLOPS for an ordinary engineering workstation or minicomputer—prompting the nickname "tabletop supercomputer" for this new machine. The NEW POWER 4860 supports several microcomputer operating systems, including DOS, OS/2, and SCO. Targeted applications include petroleum and geological data analysis and processing, weather data analysis and processing, structural analysis calculations, machinery design and simulation, and CAD.

Mainframe Digital Simulation Software Releases Certified*93FE0421B Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 4, 3 Feb 93 p 2*

[Article by Hou Mei Zhu [0186 2734 4554]: "Nation's Mainframe Digital Simulation Software at Advanced International Level"]

[Text] A 400,000-line-statement mainframe digital simulation public software system including a simulation algorithm software package of two general-purpose and seven specialized programs and five user-oriented, subject-oriented simulation programs has been developed by the 204th Institute, Second Department and 12th Institute of the Ministry of Aerospace Industry (MAS). The system passed the technical evaluation of MAS on 11 January 1993.

This system is one of our nation's major technical research projects—an engineering subproject of the Beijing Simulation Center. The system not only can be used for general digital simulation and hardware-in-the-loop simulation to aid research and design of strategic and tactical ballistic missiles and launch vehicles, but also provides a practical and good developmental environment for digital simulation and scientific calculations in civilian systems such as those in energy, chemical engineering, manufacturing, transportation, automation and economics. This system runs on VAX-11/780, YH-F1, and other simulation computer systems and on SGI and SUN workstations.

Actual testing indicates that this system's unique simulation algorithms on average increase speed by 1 to 2 orders of magnitude compared to conventional algorithms. In addition, this system has functions such as block-diagram-oriented graphics input, animation display and concurrent distributed simulation operating mode.

The experts feel that this software system has reached international standards: The theory and design of its simulation algorithms, structure and functions of the simulation language, integrated modularized construction, and the concurrent distributed simulation operating mode in the simulation environment are very creative, and it is more systematic and practical than similar software currently available worldwide.

SCO Markets XENIX, UNIX, ODT Software in China*93FE0421A Beijing JISUANJI SHIJIE [CHINA COMPUTERWORLD] in Chinese No 4, 3 Feb 93 p 3*

[Article by Shen Haiying [3088 3189 5391]: "SCO Introduces XENIX, UNIX, and ODT Software to Chinese Users"]

[Text] On 8-9 January 1993, SCO of USA, Horizon Electronics Ltd. of Hong Kong and Zhongruan Corp. held a seminar discussing SCO's software. SCO introduced its software, such as XENIX, UNIX (its most current version) and ODT to the Chinese clients.

XENIX System V Release 2.3.4 offered by SCO is the firm's most current XENIX version. Its Chinese version has not only Sinicized and improved upon the English version's XENIX kernel, but also added the Chinese printing program. The Sinicization of the kernel includes Chinese-character input and display and on-screen editing in Chinese. Its character base uses the 16 x 16 national-standard dot matrix format. Therefore, the Sinicized version of XENIX System V Release 2.3.4 runs not only on 386, 486 and compatible microcomputers, but also on various Chinese-made 386 and 486 microcomputers equipped with Chinese-character cards.

The most current version of SCO UNIX's Release 3.2 Version 4.0 was made available to the Chinese market in the fourth quarter of 1992. It offers the "multiple-architecture kernel" so that the same kernel can operate with any hardware architecture complying with the ISA, EISA and MCA industrial standards.

Open Desktop (ODT) is a complete graphics operating system. The services provided by ODT are in the following five categories: ODT-OS operating system service, ODT-View graphical user interface, ODT-NET networking and document sharing, ODT-DOS DOS compatible service and ODT-DATA relational data base management service. Using TCP/IP, NFS and LAN Manager, ODT-NET offers the capability of Ethernet

networking and document sharing. These three ODT software packages make it possible to connect one open desktop to another.

SGI Unveils New Workstations, Servers in Beijing
93P60208B Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 9, 10 Mar 93 p 3

[Article by Chen Chunmei [7115 2504 2734]: "SGI Unveils New Workstations in Beijing"]

[Summary] At a press conference held on 5 March in Beijing, the U.S. firm SGI [Silicon Graphics Inc.] unveiled four new series of workstation and server products—the first marketing in China of these new

product series which were announced in the United States at the end of January. The new products include the Power Challenge server series, with 64-bit TFP stream-oriented superscalar RISC processors; the L tabletop model, with 2-6 TFP processors, delivers a peak performance of 1.8 GFLOPS, while the XL cabinet-style server system, with 2-18 TFP processors, provides a peak performance of 5.4 GFLOPS. The other products are the Challenge symmetric multiprocessor server series, with a 4000 Dhrystone MIPS multiprocessor system (maximum 36 RISC processors); the OnyxTM graphics supercomputer series with an R4400 multiprocessor system; and the Indigo² Extreme workstation, which combines the powerful Extreme graphics board with eight R4400 R4000 MIPS RISC processors.

Beijing FEL With Optical Klystron Configuration

93FE0381A Shanghai GUANGXUE XUEBAO [ACTA OPTICA SINICA] in Chinese Vol 12 No 11, Nov 92 pp 961-968

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[Excerpts] Abstract: Using the KMR equations, together with overall experimental parameters of the Beijing Free Electron Laser (BFEL), a study of the optical klystron (OK) configuration is conducted. Parameters such as input power, electron-beam energy dispersion, dispersion magnetic field, length and position of drift space and the effect of current on the gain of the OK are analyzed and calculated in detail. Based on BFEL's oscillator configuration, a set of OK parameters that suit the electron-beam energy dispersion requirements is presented. Furthermore, analysis is also done on its saturated power, power spectrum and tapered wiggler.

1. Introduction

The OK configuration is novel for an FEL. Due to its high gain in a weak field, it is particularly suitable for use in a short-wavelength FEL that employs an intense relativistic electron beam. As far as output is concerned, an OK may bring the saturated gain area forward.¹ This feature has practical value for an X-ray FEL that is based on amplified spontaneous emission (ASE).²

In principle, an existing FEL model³⁻⁶ may be adopted for the theoretical analysis of the OK. However, because numerical computations for an OK involve a large number of varying parameters, most theoretical work is analytic in nature.⁷ Numerical simulation is limited to the single-particle calculations done by Colson, or the one-dimensional Vlasov equation simulation done by Boscolo. Well known three-dimensional FEL simulation programs such as FRED have not been used for an OK. One of the authors has used the KMR equation to compute the gain and electron energy spread for an OK of a millimeter-wave small-period-wiggler FEL.^{8,9} Furthermore, it was discovered that an OK configuration operating in a nonlinear region could improve the efficiency of the FEL.

This work is exploratory in nature. The purpose is to select a suitable theoretical model to perform numerical simulation for the OK configuration of the BFEL and to investigate its gain mechanism as well as the requirements imposed on different physical parameters. The KMR equation is used to compute various parameters of the FEL. Furthermore, the program is relatively simple in structure and has concise physical meaning. It can easily run on a minicomputer even a microcomputer.

2. Theoretical Model and Program

[Passage omitted] Let us assume that the spatial matching factor between the electron beam and laser is close to 1 and wave loss is negligible. The OK4 program was designed using the Runge-Kutta method and FORTRAN 77. This program can calculate various parameters associated with the OK and FEL. In the program, the initial electron beam follows a uniform or Gaussian distribution in the (γ, ψ) space. The largest number of electrons to be simulated, nP , is 501. Each iteration requires solving $2nP + 2$ differential equations. OK4 runs on an AST 486 computer. With a screen display program DEM and a plotter program C2DSB, various curves and variations of phase distribution of electron energy can be displayed on the monitor and plotted by a plotter.

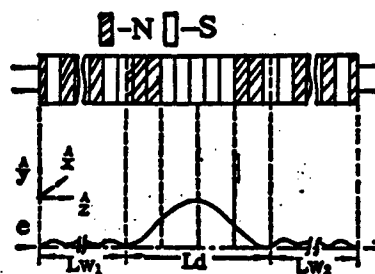


Figure 1. Schematic of an Optical Klystron (OK) Configuration; top is magnet assembly, bottom is electron orbit

3. Results of Numerical Simulation of OK

A large number of variables are computed as a function of the strength, length and insertion position of the dispersion magnetic field while keeping the basic physical parameters¹⁰ of the BFEL constant. An analysis of the results shows that an OK configuration can improve the small-signal gain of the BFEL. The increase in amplitude is a function of the strength, length and insertion position of the dispersion magnetic field. In the meantime, the OK configuration imposes more stringent requirements on the energy spread of the electron beam and the dispersion magnetic field. After taking into consideration BFEL's resonant cavity structure and the dimensions of its existing NdFeB permanent wiggler magnet, the following is a list of parameters for the BFEL with an OK configuration and a suitable electron-beam energy spread requirement: $I_e = 10$ A, $\Delta\gamma/\gamma = 0.2$ percent, $\gamma = 55$, $B_w = 0.533$ T, $\lambda_w = 3$ cm, $L_{w1} = L_{w2} = 0.69$ m, $L_d = 0.48$ m, $B_d = 0.1$ T, and $\lambda_s = 10.6$ μ m. Figure 2 shows the dependence of small-signal gain on input power. From the figure, one can see that compared to the BFEL the OK has a higher small-signal gain (approximately 2.4 dB). However, the electron energy conversion efficiency is sacrificed. Its saturated power is of the order of 0.1 MW, while that of the BFEL is of the order of 10 MW. Figure 3 shows the dependence of small-signal gain on

beam energy spread. Obviously, as the OK improves the small-signal gain of the FEL, it also imposes a more stringent requirement on the beam energy spread. When $\Delta\gamma/\gamma > 0.5$ percent, the OK can no longer operate effectively. With $P_{in} = 3.8$ kW and $\Delta\gamma/\gamma = 0.2$ percent, Figure 6 shows OK gain as a function of axial distance. Apparently, after passing the drift area, OK gain rises rapidly. At $z = 1.86$ m, the upward trend still remains. In an OK, after electrons pass through the drift area, their distribution and the corresponding wave envelope are much more complicated than those in an FEL. Furthermore, the distribution of electron clusters in the energy-phase space (γ, ψ) is different with respect to different input power, as shown in Figure 4. The dependence of small-signal gain upon beam current in an OK remains linear, just as that for the BFEL. A tapered-wiggler design has been investigated under the conduction of intense light input ($P_{in} = 0.4$ MW). Figure 5 shows the dependence of wiggler taper, ϵ_w , upon small-signal gain of OK when $z = 1.27$ m. When $\epsilon_w = 1.5 \times 10^{-4}$, the OK saturated gain reaches its maximum, $G_{max} = 0.229$ dB. Figure 6 shows the gain of TOK (tapered OK) and the gain of COK (constant OK) as a function of axial distance. From this figure, one can see that the COK reaches its maximum of $G_{max} = 0.0994$ dB at $z_s = 1.30$ m. The COK gain begins to oscillate as the length of the interaction area increases ($z > z_s$) and cannot go up any longer. However, for a TOK, the curve still rises up to $z = 2.68$ m after $z > z_s$ without reaching saturation. Hence, the tapered wiggler is effective for an OK. This result is a valuable reference for the development of an X-ray FEL with an ASE OK configuration. However, it is very difficult to design an optimal taper for the BFEL so that the taper wiggler OK has a higher small-signal gain than that of the FEL everywhere during the entire oscillating process because of its oscillator structure. Our computations show that a desirable taper for an intense input light becomes a poor choice for a weak input light (see Figure 6). The effects of a tapered wiggler and a variable-period wiggler on an OK and an FEL are identical. Similar design computation results will not be presented here.

4. Dependence of OK Gain Upon Resonance Parameters

In order to help us understand OK operating characteristics, the relation between FEL gain and resonance parameter (B_w or λ_s) is investigated. From the Madey theory, due to the low-gain unsaturated interaction process, the FEL gain spectrum is a derivative of the spontaneous radiation spectrum of the electrons. Furthermore, the computations show that the dependence of OK gain upon its resonance parameter is far more complex than that of an FEL. Correspondingly, the computing workload also increases by an order of magnitude. The authors first fixed $B_w = 0.533$ T, $\Delta\gamma/\gamma = 0.2$ percent and $P_{in} = 1$ W to obtain the dependence of the gain of the OK on the dispersion magnetic field, as shown in Figure 7. The curve is not stable and exhibits peaks at $G = 8.811, 20.68, 24.99$, and 25.15 dB when $B_d = 0.4200$ T, 0.4525 T, 0.6375 T, and

0.7800 T, respectively. In theory, these extremes are suitable for ASE experiments with an FEL. In addition, the authors calculated the OK gain versus beam energy spread curves in different dispersion magnetic fields, as shown in Figure 8. One finds out from Figure 8 that the higher the OK small-signal gain, the more stringent the beam energy spread requirement becomes. For instance, at $B_d = 0.78$ T, when $\Delta\gamma/\gamma = 10^{-4}$, the gain of the OK is already in a nonlinear region. Based on this observation, the instability of the gain curve shown in Figure 7 might be due to the fact that the beam energy spread is set too large ($\Delta\gamma/\gamma = 0.2$ percent) which causes the OK to operate in a nonlinear region. Factors affecting the accuracy of computation are under investigation. Therefore, it is demonstrated that a beam energy spread of the order of 10^{-2} from the RF accelerator already causes the OK to operate in a nonlinear region. Hence, the dispersion magnetic field is required to be tunable over a certain range and to have a higher level of accuracy. The single-pass gain spectra of the OK at different dispersion magnetic fields have also been computed (see Figure 9). From the figure, one finds that the optimal pumping wavelength $\lambda_s' = 10.5$ μm . Apparently, the famous Madey theory no longer applies to an OK. From Figure 10, when the pumping laser power $P_{in} = 1$ W and $B_d = 0.1$ T, the number of oscillations to implement saturated OK power output is approximately 30. If the device is started by spontaneous radiation, since the spontaneous emission power of the electron is of the order of 10^{-4} W, actually 21 additional oscillations are required. That is, when the light passes the optical cavity 51 times, an OK started by spontaneous radiation will be saturated. However, its saturated cavity power is far below that of the BFEL, i.e., about 0.35 MW. If the dispersion magnetic field strength is increased to raise the single-pass gain of the OK, then it only takes a few passes for the device to reach saturation. Nevertheless, the corresponding saturated cavity power is even lower.

5. Conclusions

Using the KMR equation and taking the beam energy spread into consideration, different variables associated with the OK configuration of the BFEL have been computed. Major operating characteristics of the OK are clearly illustrated using this simple model. Furthermore, studies have been done on the tapered-wiggler OK, the dependence of OK gain upon dispersion magnetic field, and the OK electron energy distribution in phase space. The results indicate that an OK configuration with a high single-pass gain can relax the beam pulse width requirement by several fold. With respect to the existing BFEL, the beam spread requirement needs to be raised from 0.5 percent to 0.2 percent. In addition, the dispersion magnetic field must be tunable and more accurate. It is feasible to conduct proof-of-principle experiments under these premises. This experiment will provide beneficial experience for the development of short-wavelength (even X-ray) FELs in the future.

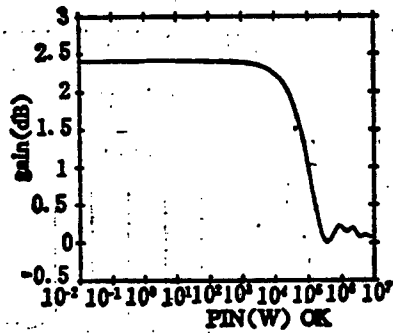


Fig. 2 The dependence of small-signal gain of BOK on input power

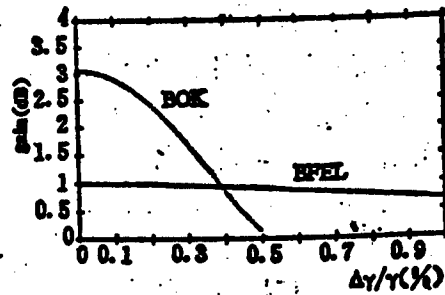
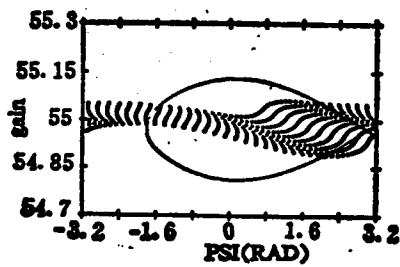
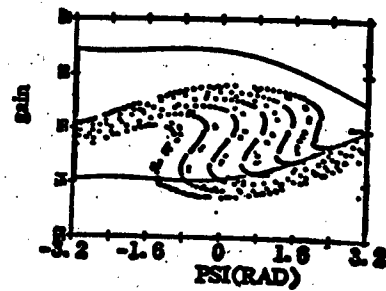


Fig. 3 The dependence of small-signal gain of BOK on beam energy spread



(a)



(b)

Fig. 4 The distribution of particles of BOK after drift area in the phase space at:
(a) $P_{in}=10\text{ kW}$, $s=1.515\text{ m}$, (b) $P_{in}=0.4\text{ MW}$, $s=1.86\text{ m}$

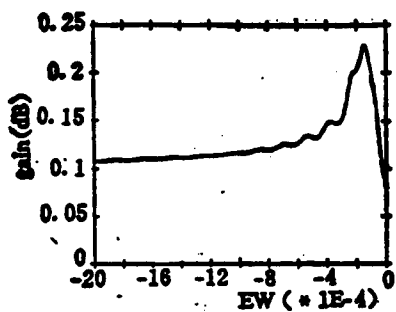


Fig. 5 The gain of OK versus taper of wiggler at $P_{in}=0.4\text{ MW}$, $s=1.27\text{ m}$

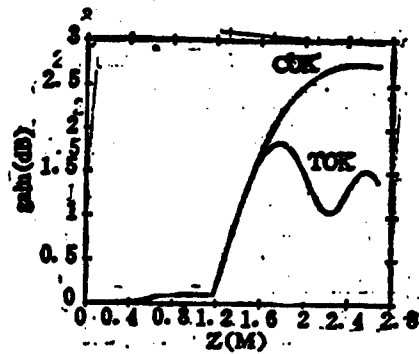


Fig. 6 The gain of TOK and COK versus axial distance at $P_{in}=3.8\text{ kW}$

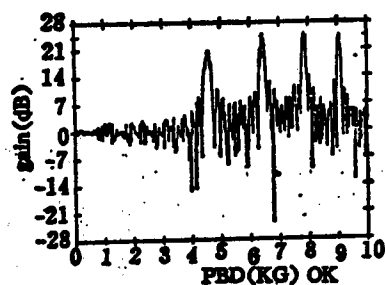
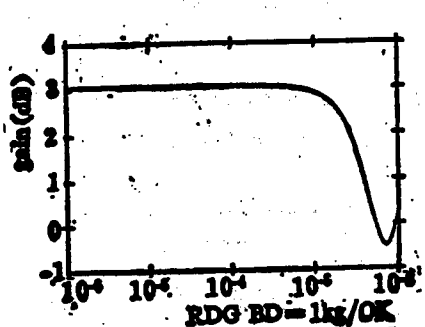
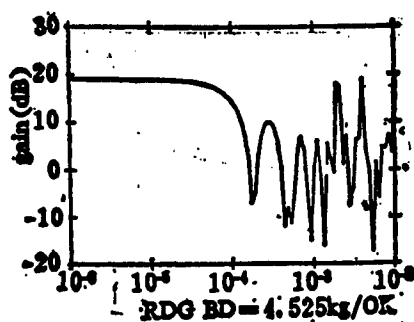


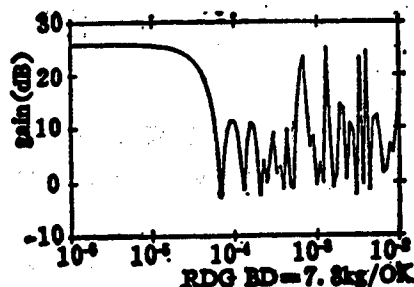
Figure 7. The Gain of OK Versus the Field of Dispersion Magnet at $P_{in} = 1$ W



(a)



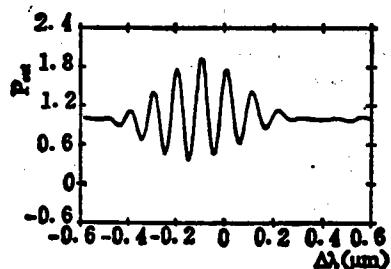
(b)



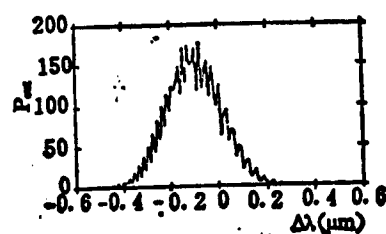
(c)

Fig. 8 The dependence of the gain for different fields of dispersion magnet on beam energy spread at $RDG = \Delta\gamma/\gamma$, $P_{in} = 1$ W

(a) $B_d = 0.1$ T, (b) $B_d = 0.4525$ T, (c) $B_d = 0.78$ T



(a)



(b)

Fig. 9 The dependence of the gain for different fields of dispersion magnet on wavelength at $P_{in} = 1$ W, $\Delta\lambda = \lambda - \lambda_s$, $\lambda_s = 10.6 \mu\text{m}$

(a) $B_d = 1$ kG, (b) $B_d = 4.525$ kG

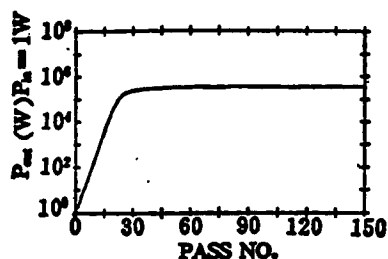


Figure 10. The Dependence of OK Power in the Cavity on the Number of Oscillations at $P_{in} = 1 \text{ W}$, $B_d = 0.1 \text{ T}$

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GaAs 2x2 Mach-Zehnder Optical Waveguide Switch/Modulator

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[Article by Feng Hao [7458 3185], Li Xihua [2621 6932 5478], Wang Minghua [3769 2494 5478], and Yang Zuoya [2799 0146 1246] of the Department of Information and Electronic Engineering, Zhejiang University: "GaAs 2x2 Mach-Zehnder Optical Waveguide Switch/Modulator"; MS received 14 Oct 91, revised 20 Dec 91]

[Excerpts] Abstract: Research results of a GaAs 2 x 2 asymmetric Mach-Zehnder waveguide switch/modulator are reported. The operating principle of the device and the factors that produce crosstalk are analyzed. Two asymmetric X-junctions are used, instead of conventional Y-branches. A 3 dB coupler with excellent performance is obtained. The device has a crosstalk ratio of less than -22.4 dB when operating at approximately 12 V with $\lambda = 1.15 \mu\text{m}$.

1. Introduction

One of the basic devices in integrated optics is a 2 x 2 optical waveguide switch, a critical element in an optical switching array. There are several types of switches such as the conventional directional coupler switch,^{1,2} TIR (total internal reflection)³ waveguide switch, BOA (bifurcation by optical activation)⁴⁻⁶ waveguide switch, and asymmetric Mach-Zehnder⁷ interference waveguide switch. The asymmetric Mach-Zehnder (M-Z) waveguide switch was first presented by Izutsu et al. in mid 1980's and was fabricated on LiNbO₃. It employs two asymmetric X-junctions to replace the traditional Y-branches, and can operate in a push-pull mode to effectively lower the switching voltage. Results obtained on high-speed M-Z modulators can also be directly applied to this switch to produce a fast 2 x 2 switch and a corresponding high-speed switching array. Currently, this device is primarily fabricated on LiNbO₃. Some asymmetric X-junctions have been made on glass.⁸ The authors for the first time reported the fabrication of GaAs asymmetric X-junctions in reference 9. For the first time, the development of a GaAs 2 x 2 asymmetric M-Z waveguide switch/modulator using two asymmetric X-junctions is reported in this paper.

2. Principle

The asymmetric M-Z waveguide switch employs two asymmetric X-junction couplers to replace the conventional Y-branch couplers in the M-Z modulator. Its structure is shown in Figure 1(a). When a polarized beam enters a single-mode waveguide (such as waveguide a) from junction "1" on the left, the basic mode is produced by way of excitation. Based on mode coupling

theory, two basic modes will be produced in the other single-mode input waveguide (waveguide b) in the same branch. These two modes cancel each other because they are equal in amplitude and opposite in phase. In the branch that is comprised of these two single-mode input waveguides, the mode of identical phase is called the even mode (or symmetric mode) and the mode of opposite phase is the odd mode (or asymmetric mode). The odd mode and even mode propagate along the positive z direction. In this branch, the two modes superimpose (see Figure 1(b)). They exit from the two asymmetric single-mode output waveguides on the right of junction "1." The even mode exits from the wide waveguide and is converted to become the basic mode of the waveguide. The odd mode exits from the narrow waveguide and is also converted to become the basic mode of that waveguide. These two basic modes are opposite in phase. In this case, junction "1" has the effect of a 3 dB coupler. The two beams of light of equal energy from the 3 dB coupler undergo phase modulation in an active region. In this region, because the two asymmetric single-mode waveguides are spaced well apart, there is no mode coupling between waveguides. The two basic modes pass the active region separately to produce a relative phase of $\Delta\phi$ before entering X-junction "2" on the right. Interference of these two beams of light of different phase takes place here and the zeroth-order mode produced exits from the upper waveguide of junction "2" (waveguide c). The next higher-order mode exits from the lower waveguide (d). In this case, junction "2" plays the role of an interferometer. Figures 1(b) and 1(c) represent the ideal optical field distribution in different regions of the switch when the phase difference is 0 and π , respectively. [passage omitted]

4. Design and Fabrication of Device

In the design of the device, the effective refractance method and mode coupling theory are employed. In references 8, 10-12, the authors point out that in order to realize mode separation in an asymmetric coupler, the branch angle θ must satisfy the following condition:

$$\theta \ll \Delta\beta/\gamma$$

where $\Delta\beta$ is the propagation difference constant of an asymmetric waveguide and γ is the propagation constant of the planar waveguide between the two waveguides. During the design of the ridge GaAs waveguide switch, by way of effective refractance calculation, it was determined that the branch angle should be less than 1° when the symmetric waveguide width is $5 \mu\text{m}$, asymmetric waveguide widths are $5.5 \mu\text{m}$ and $4.5 \mu\text{m}$, ridge height is $1.2 \mu\text{m}$ and waveguide thickness is $2.3 \mu\text{m}$. Therefore, the branch angle of the asymmetric side is chosen to be 0.4° and that of the symmetric side is chosen to be 0.8° . The spacing between waveguides is $14 \mu\text{m}$ in the active region and the length of the active region is 5 mm .

The device is fabricated on an epitaxial GaAs wafer. A $2.3\text{-}\mu\text{m}$ -thick epitaxial layer of $n^+ \text{GaAs}$ ($n \leq 10^{15} \text{ cm}^{-3}$)

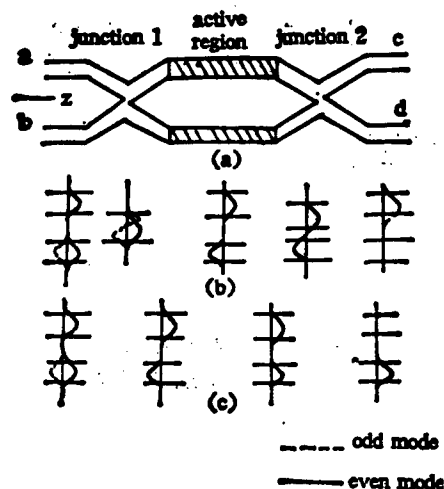


Fig. 1 Structure of the asymmetric M-Z switch (a), and the optical field distributions in any regions at the applied voltage of 0V and V_π (b), (c)

is vapor deposited on the (100) surface of an $n^+ \text{GaAs}$ ($n^+ \geq 10^{18} \text{ cm}^{-3}$) substrate. Al-Schottky contacts are made using a stripping technique. A wet etching method is used to produce the ridge waveguide. A phosphoric-acid-based etchant, $\text{H}_3\text{PO}_4:\text{H}_2\text{O}_2:\text{H}_2\text{O} = 1:1:10$, is used. Figure 2 [photograph not reproduced] shows the ridge waveguide. The lower electrode is an ohmic contact made of an Au:Ge:Ni alloy.

5. Device Testing

A $\lambda = 1.15 \mu\text{m}$ He-Ne laser is used as the light source. The light is focused and coupled at the end face of the waveguide. The output is collimated with a lens and an infrared camera is used to photograph the output spot. Its near-field distribution (spot) is displayed by a monitor and then recorded with a high-speed waveform storage device. Figure 3 shows the principle of the measuring system. Cleavage of the X-junction shows a power distribution of less than -2.9 dB . Figure 4 [photograph not reproduced] shows the output spot of the asymmetric 3 dB coupler and its field distribution; it illustrates the excellent behavior of the 3 dB coupler. Figure 5 [photograph not reproduced] shows the spots and fields at different voltages. Our measurements show that the crosstalk ratio is less than -22.4 dB for the 2×2 switch operating at 12 V . (This switching voltage is the difference of modulating voltages that produce the maximum and minimum light power output from the waveguide.) Figure 6 shows the output power as a function of the driving voltage.

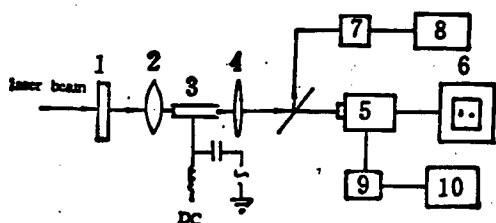


Figure 3. Schematic of the Measuring System

1. Polarizer; 2, 4. Lens; 3. Sample; 5. IR camera; 6. Monitor; 7. Detector; 8, 10. Oscillograph; 9. Choosing line memory

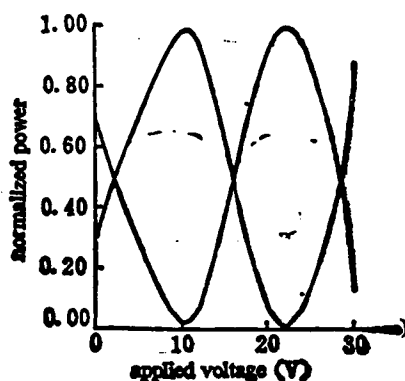


Figure 6. Power Variation Versus the Applied Voltage

6. Conclusions

A GaAs M-Z 2 x 2 optical switch has been developed. Two asymmetric 3 dB X-couplers (interferometers) are employed to achieve a crosstalk ratio of less than -22.4 dB at an operating voltage of 12 V. The waveguide transmission loss is below 0.7 dB/mm. The major cause of transmission loss is due to absorption of substrate carriers. Although transmission loss can be reduced by increasing the waveguide thickness, modulating voltage will have to rise accordingly. If the waveguide thickness is increased to 3.5-4 μm to lower the waveguide transmission loss to 0.5 dB/mm, the modulating voltage will have to be increased to 30-40 V. Therefore, the effective way to lower transmission loss is to use a heterojunction structure. This type of waveguide structure can reduce the transmission loss to 0.02 dB/mm or below.¹³ Hence, this type of asymmetric GaAs M-Z switch may be used in a GaAs switching array.

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MM-Wave Double Varactor Tuned Oscillator

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XUEBAO [JOURNAL OF INFRARED AND
MILLIMETER WAVES] in Chinese Vol 11 No 6,
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[English abstract of article by Wang Dongjin and Li Dunfu of the Department of Radio and Electronics, University of Science and Technology of China, Hefei, Anhui 230026, China; MS received 4 Oct 91, revised 11 May 92]

[Text] The analysis and design of a new-type MM-wave—reflection-type cavity stabilized, double varactor tuned Gunn oscillator—are presented in this paper. The performance of the VCO is: phase noise: -60 dBc/Hz ($f_m = 1$ kHz), -95 dBc/Hz ($f_m = 50$ kHz); rough tuning: 10-20 MHz/(0-15)V; fine tuning: +/- (1-3) MHz/(0-15)V. This new type of VCO has been successfully applied in a MM-wave Doppler pulse radar.

Infrared and Millimeter-Wave Scattering of Two-Dimensional Conductor-Dielectric Periodic Structures

40100072B Shanghai HONGWAI YU HAOMIBO
XUEBAO [JOURNAL OF INFRARED AND
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[English abstract of article by Dong Tianlin of the Department of Electronics and Information, Huazhong University of Science and Technology, Wuhan, Hubei 430074, China; MS received 17 Jul 91, revised 7 Jul 92]

[Text] Based on rigorous electromagnetic theory, an improved method suitable for analyzing infrared and millimeter-wave scattering of two-dimensional conductor-dielectric periodic (2DCDP) structures is presented in this paper. The effects of all electromagnetic parameters and geometric sizes, including those of the thickness and finite conductivity of conductors, are taken into account and the numerical results can be obtained without invoking any basis functions.

Experimental Research on 4-6 GHz High-Tc Superconducting Microstrip Antenna

93P60206A Beijing KEXUE TONGBAO [CHINESE SCIENCE BULLETIN] in Chinese Vol 38 No 3, 1-15 Feb 93 pp 212-215

[Article by He Yisheng [0149 5337 3932] of North China Industrial University and Visiting Research Fellow at Qinghua University; Cao Bisong [2580 1801 2646], Liu Zhihui [0491 1807 6540], et al. of Qinghua University Dept. of Modern and Applied Physics; and Zhang Xuexia [1728 7185 7209] and Yu Tiejun [0151 6993 6511] of Qinghua University Dept. of Electronic Engineering, Beijing 100084: "Experimental Research on 4-6 GHz High-Tc Superconducting Microstrip Antenna"; supported by grants from NSFC and the State Superconductivity Research Center; MS received 29 Apr 92, revised 15 Oct 92]

[Abstract] Following upon their 1989 development of a Bi-based magnetic resonator antenna² and their June 1990 development of a bulk-Bi-based superconducting microstrip antenna,³ the authors describe their June 1991 directional-plot measurements of a 4.7 GHz high-Tc superconducting microstrip antenna, whose development was first announced in reference 4. Fabricated on a substrate of polytetrafluoroethylene and glass fiber, the antenna has the following composition: $\text{Bi}_{1.84}\text{Pb}_{0.34}\text{Sr}_{1.91}\text{Ca}_{2.03}\text{Cu}_{3.06}\text{O}_{10-x}$. Following mixing and presintering, a 50-mm-diameter, 1-mm-thick wafer was prepared under a 60 torr atmosphere. After high-pressure sintering, a bulk material with a Tc of 103-108K

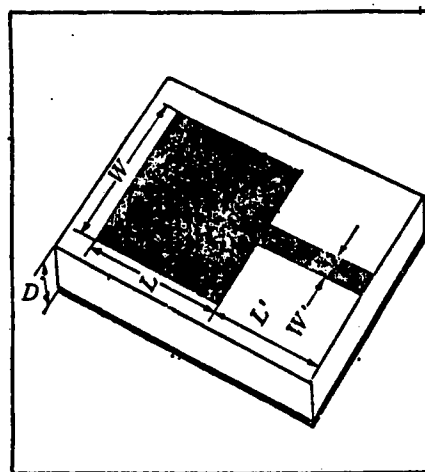


Figure 1. Schematic of Microstrip Antenna

was formed. Three sizes (M-1, M-2, and M-3), with the third size doped with 5 percent Ag, were tested. The antenna schematic and the design dimensions of the three sizes are given below in Figure 1 and Table 1, respectively. In Table 1, S_{21} is the transmission coefficient for the superconducting antenna, while S'_{21} is the transmission coefficient for an ordinary copper antenna. Figure 2 (not reproduced) shows the measurement setup, while Table 2 and Figures 3-5 (not reproduced) give various measurements and directional plots.

Table 1. Microstrip Antenna Design Dimensions

No	W (mm)	L (mm)	W' (mm)	L' (mm)	f (GHz)	S_{21} - S'_{21} (dB)
M-1	26.78	21.34	4.00	6.00	4.3	1.2
M-2	11.94	9.88	2.14	3.00	5.8	5.5
M-3	23.01	19.69	4.12	9.21	4.7	4.6

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First Domestically Made DS5 Fiber Optic Cable System Operational

93P60209B Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 9, 10 Mar 93
p 23

[Article by Xing You [5281 1429]: "First Domestically Made DS5 Fiber Optic Cable Communications System Operational"]

[Summary] The Shanghai-to-Wuxi 565 Mbps (i.e., DS5) fiber optic cable communications system experimental project—a State Eighth FYP Key S&T Project—became formally operational (full length) on 6 January. This new line, representing a major breakthrough for the nation's high-technology development, is the first domestically made long-distance DS5 fiber optic line. In addition to 7680 telephone circuits, the line also provides 360 inter-district circuits for various station-to-station services. This 167-km-long experimental line connects Shanghai with Jiading, Taicang, Kunshan, Suzhou, and Wuxi. All equipment was developed and furnished by the Wuhan Institute of Posts and Telecommunications Science, and all technical performance indicators comply with CCITT recommendations.

Taiji Unveils New Fiber Optic Computer Network Products

93P60209A Beijing JISUANJI SHIJIE [CHINA
COMPUTERWORLD] in Chinese No 9, 10 Mar 93 p 15

[Article by Zhao Chen [3564 2525]: "Taiji Corp. Holds FDDI Network Products Demonstration"]

[Summary] In the past few years, the Taiji Corp. has held demonstrations of its new-generation high-speed FDDI (fiber distributed data interface) fiber optic computer network products. Recently, Taiji unveiled its state-of-the-art (early 90s international level) FDDI product series, which permits direct interconnection of various computer systems and Ethernets to fiber optic token ring LANs (no optical terminal required) with a 100 Mbps transmission rate. With multimode fiber, maximum interstation range is 2 km, with a maximum of 200 km of fiber for the entire network. With single-mode fiber, maximum interstation range exceeds 20 km. Taiji's newest products include the TJ-FDDI-100 series of Ethernet bridges which provide transparency between TCP/IP, DECnet and other high-layer network protocols and between Netware, LAN Manager and other network operating systems. The TJ-FDDI network card series, consisting of the 1200, 1100, and 1600 models, are designed for EISA-bus microcomputers, ISA/AT-bus microcomputers, and S-Bus workstations, respectively, and support a variety of protocols and software, including SMT, LLC, Netware, LAN Manager, TCP/IP, UNIX, and SNMP.

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